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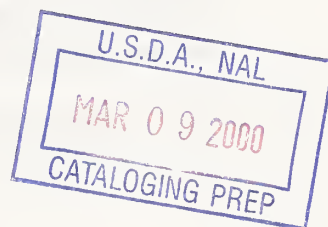
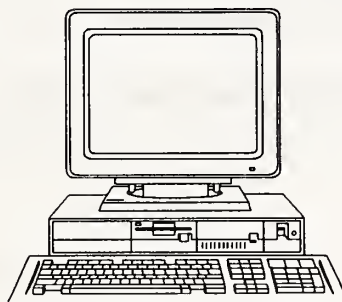


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# TS Software User Manual for the TIME SERIES Program and Utilities

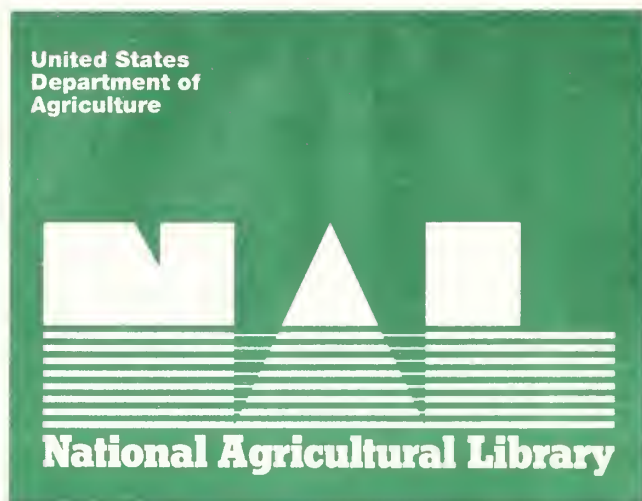
Alan Webb, Karl Gudmunds, and  
Gene Hasha



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**TS Software User Manual for the TIME SERIES Program and Utilities.** By Alan Webb, Karl Gudmunds, and Gene Hasha. Agriculture and Trade Analysis Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 9302.

### **Abstract**

TIME SERIES (TS) is a software program used to view graphs or tables of data from annual time series databases. It operates on IBM or compatible personal computers. A version of this software is distributed as PS&D VIEW, which includes annual data reported from more than 190 countries or regions for over 60 major agricultural commodities. The TS software greatly eases the review and initial analysis of this and other large PC databases. Features include quick access to scrolling tables, chart plotting of series, trends, projections, and profiles, calculation of summary statistics, and data file exporting. The main program is accompanied by several utilities that allow users to build and manipulate annual databases for use in the TS program. This document describes the capabilities and use of the TS program and utilities.

**Keywords:** TS, TIME SERIES, PS&D VIEW, software, database

### **Acknowledgments**

The success of TS is largely the result of the continuous interaction between TS database users and the software's developers. We thank the Agriculture and Trade Analysis Division (ATAD), the Commodity Economics Division (CED), and the Data Services Center (DSC) of the U.S. Department of Agriculture's (USDA) Economic Research Service (ERS) for continued support of this project.

We are indebted to ERS commodity and country analysts who have given us suggestions for improvements. The assistance of Sharon Sitzman of CED has been essential to the integration of the software and data. We thank Bill Kost and Judy Garza for reviewing the manuscript.

We appreciate the widespread support we have received from around the world for our efforts to develop and refine TS and PS&D VIEW. This response encourages us to continue to improve the software and data coverage.

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# TS Software User Manual for the TIME SERIES Program and Utilities

Alan Webb, Karl Gudmunds, and Gene Hasha

## Introduction

The development, testing, and public distribution of PS&D VIEW: User's Manual and Database<sup>1</sup> has demonstrated the value of user-friendly software for viewing tables and graphs of a major USDA database on a personal computer. The essential characteristic of the PS&D VIEW software is that its operation is so simple and so fast that most people can conquer its principal features within a few minutes. This gives users instant access to a large comprehensive database, allowing them to begin to formulate hypotheses and investigate relationships that would not have even been considered in less tractable frameworks. Thus, the PS&D VIEW software fills a niche not addressed by commercial spreadsheet and database packages that must sacrifice simplicity and speed to meet the more general requirements of a diverse set of uses.

The success of PS&D VIEW has led to demands for similar software applicable to other data. In response, we have developed a data viewer program called TIME SERIES (TS) and a suite of TS data utilities. The TIME SERIES program provides the same capabilities as PS&D VIEW for any annual time series data and the utilities allow data file manipulation. One TS utility allows conversion of structured data files in ASCII format into TS data files. Other utilities permit the user to manipulate existing TS files or to create new TS data files from components of other TS files.

The software capabilities that have already been developed are substantial, even though the development of the TIME SERIES program and utilities is incomplete and far from being a comprehensive data viewing and manipulation package. Many people within ERS are already using the system for organizing, viewing, and distributing their own databases. This instruction manual will broaden the user base of the TIME SERIES program and utilities and, we hope, facilitate collaboration with others on further software and data developments.

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<sup>1</sup> Published and updated annually in November since 1989 by Alan Webb and Karl Gudmunds, U.S. Dept. of Agr., Econ. Res. Serv.

## About the Manual

This manual is divided into two sections. The first is a quick overview of software features and capabilities of the TIME SERIES program itself. We keep the discussion on how to invoke these features to a minimum. It is our experience that most users do not want to wade through detailed documentation before using a program, particularly when most procedures are self-evident from the menus. We provide explanations where the menu selections are less obvious. You can call up extensive help screens by pressing the F1 key.

The manual's second section contains information on how to use the TIME SERIES utilities for creating and manipulating TS data files. Users will find some of these utilities less tractable than the TIME SERIES program itself. There are two reasons for this. First, we have essentially taken the programs to create and manipulate the standard USDA supply-utilization files and made modifications so that the utilities would be more generic. Thus, the utilities work best on data files with a structure similar to the annual commodity-country-balance sheet structure of the PS&D data. Their application to other types of database structures may not work as well. Second, the use of the TIME SERIES utilities has not been as widespread as the PS&D VIEW program and, consequently, we have not had the level of user feedback that we need to refine these programs. A key objective in publishing this manual is to encourage the use of the utilities and stimulate suggestions for further developments.

You will find the following typographic conventions throughout this manual.

<u>Type style</u>	<u>Used for</u>
<i>italic</i>	Anything you must type exactly as it appears.
<b>bold</b>	Placeholders for information you must provide. If you are asked to type <b>FILENAME</b> , you would type the actual name of the file.
ALL CAPITALS	Program names, file names, directories, and acronyms.
SMALL CAPITALS	The names of keys on your keyboard. For example, ENTER or ESC.
Initial Capitals	Menu items and labels.
KEY1+KEY2	A plus sign (+) between key names means press and hold down the first key, then press the second key.
►	Denotes alternative choices available at a particular point in the program.



## Program Setup

Before running TS, you must install the software and some data files on your PC hard disk. See the README.DOC file on the installation disk for instructions. Type *READ* at the floppy disk drive prompt to view this file. Any last-minute information not included in this manual can also be found in the README.DOC file.

The TS software requires an IBM or compatible PC with a hard disk, MS-DOS or PC-DOS 3.0 or greater, 300 kilobytes (KB) of available RAM, and graphics capability. A math co-processor will speed calculations, but is not required. Graphics support is provided for all common graphics hardware (VGA, EGA, MCGA, CGA, and Hercules monochrome). TS will print graphs on Epson dot matrix and Hewlett-Packard laser printers, and compatibles. To use printers not supported by TS, users can enable their own graphics printing utility before starting TS. One such utility is GRAPHICS.COM in DOS 2.0 or later releases.

## Files in the TS Package

### Program Files

TS.EXE  
TS.OVR  
TS.HLP  
READ.EXE  
FV.COM

TSSHELL.CMD  
ADDYEARS.EXE  
DRIVES.EXE  
MAP.EXE  
PRINTPCX.EXE  
PRN2TS.EXE  
READ.EXE

TSBLOCK.EXE  
TSCOLUMN.EXE  
TSCOPY.EXE  
TSCOPYNM.EXE  
TSCOPYC.EXE  
TSEDIT.EXE  
TSFILE.EXE  
TSHelp.EXE  
TSJOIN.EXE  
TSSCALAR.EXE  
TSSUB.EXE  
TSSUBSET.EXE  
TSTABLES.EXE  
TSTRIM.EXE  
TSUPDATE.EXE  
WKS2PRN.EXE

### Utility Files

OPEN.BAT  
OPENALL.BAT  
COMPRESS.BAT  
COMPALL.BAT  
LHARC.EXE  
LHARC.MAN  
TSSHELL.EXE

SPECS.EXE  
TS2DBASE.EXE  
TS2DBF.EXE  
TS2MNU.EXE  
TS2PRN.EXE  
TS2WK1.EXE  
TSADD.EXE  
TSADJYR.EXE

Your TS installation disks will have a miscellaneous collection of data files, depending on data revisions and availability.

All TS software files are in the public domain and may be freely distributed. TS data released by ERS is public information. ERS can provide only very limited support to non-ERS users of the package, and cannot support users who modify the software or data files. ERS disclaims all warranties of fitness for a particular use.

## The TIME SERIES Program

Speed and ease of use have made TS popular within the USDA's Economic Research Service. Even novice computer users can

effectively use TS. No spreadsheet, graphics, or database program is required. Everything is menu-driven. The software allows the user to browse through graphs or tables of data, plot multiple-line graphs, fit trend lines, print graphs and tables, and export data for use in other programs.

## Starting TS

To start TS, type *TS* and press ENTER. A title screen will be displayed, followed by a menu of the data files available (fig. 1).

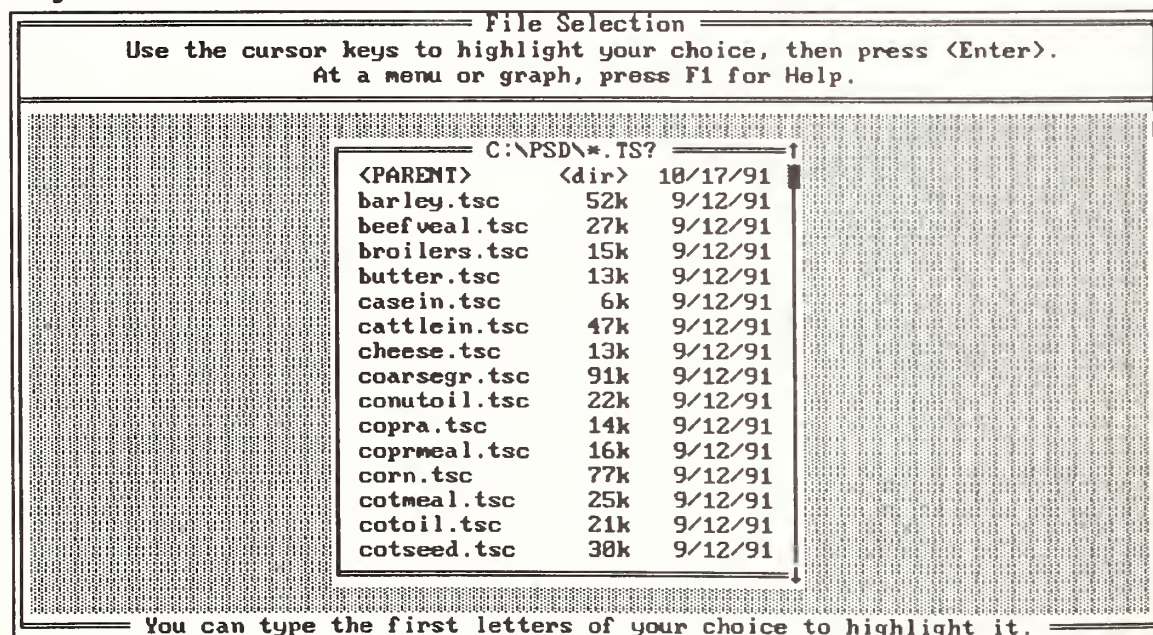
- ▶ Use the cursor keys to highlight the file to view, and press ENTER to select it. Files are shown with the date of their last revision.
- ▶ You can also highlight your choice by typing the first letters of its name. The current search string will appear in the lower left corner of the list.
- ▶ Each of the USDA production-supply-distribution (PS&D) files contain country balance sheets for a single commodity. Other TS data files may contain a variety of annual data.

## Menus and Help

Once you have made a file selection, the main menu will appear with four headings: Data, Graph, Table, and Program.

- ▶ You will see context-sensitive help displayed at the bottom of each screen; extensive help is available at the press of the F1 key. Press F1 twice for a list of help topics.

**Figure 1.** The File Selection menu





**Figure 2. The Main menu**

TIME SERIES	USDA Economic Research Service	BARLEY.TS
Data	Graph	Table
		Program

- You make all selections from menus and prompts or by pressing the following action keys, which are active at almost every screen.

Key:                      Action:

F1                      Help: This displays context-sensitive help text.

ALT+N                      Notes: Displays text notes associated with the current data file, if the text file is available. You can edit this text. Notes will not pop up while a graph is displayed.

ESC                      Escape: This backs you out of the current menu choice or exits the current graph.

ALT+X, ALT+Q                      Quit: This exits the TS program immediately.

### The Data Menu

In the Data menu, you make the choices necessary to display a data series.

- Select a data series by choosing the name of a table and column from scrolling menus (fig. 3). The two entries directly under the Data heading will differ in name, depending upon the file

loaded, but they act the same for all files. The first entry pops up a list of table names and the second entry pops up a list of column names.

- If you type the first letters of a name, the

**Figure 3. Making a choice from the Data menu**

TIME SERIES		USDA Economic Research Service		BARLEY.TS	
Data	Graph	Table	Program		

Countries	Variables
Countries	
WORLD FOREIGN CENTRALLY PLANNED NICs LESS DEVELOPED UNITED STATES CANADA MEXICO CARIBBEAN CUBA DOMINICAN REPUBLIC ARGENTINA BRAZIL OTHER SOUTH AMERICA BOLIVIA CHILE	

Select a data table.  
F1 = Help

menu selection bar will jump to the matching name. Type *NEW*, for example, to skip to New Zealand (if it is available). Press *ENTER* to select the highlighted name.

## The Graph Menu

Choices from the Graph menu (fig. 4) change the data series shown and its display. Other choices are available through hot keys while a graph is on screen.

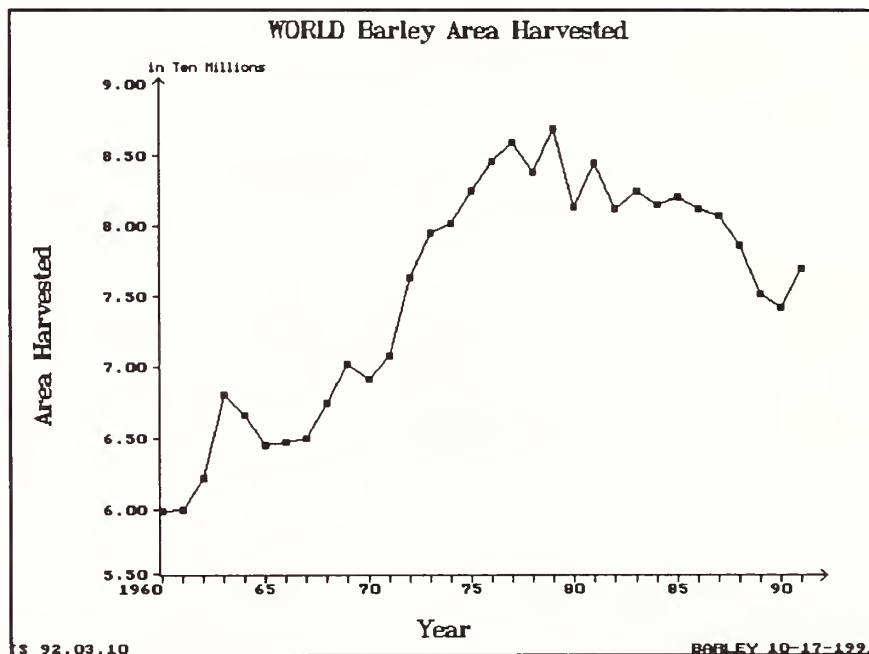
### Display

- Choose Display from the Graph menu to show a plot of the data selected. Figure 5 shows a simple line plot.
- The other Graph menu choices alter the features of the graph. First we will look at the options available when a graph is displayed on screen.

**Figure 4.** The Graph menu

Graph
Display
Trend Line
Limits
Style
Viewpoint

**Figure 5.** The Graph/Display choice plots a series



### Graph Action Keys

You have several options when a graph is displayed:

- Press *ESC* to exit the graph and return to the main menu.

- ▶ Press F1 for help on the graph action keys (fig. 6). The help box lists the choices available while a graph is on the screen. You must exit the help box before making a selection.
- ▶ Arrow and page keys (↑↓ PageUp PageDown) will change the series displayed.
- ▶ The plus key (+) lets you add up to three other series to the one displayed. The minus key (-) removes a series.
- ▶ Press A to display a table of the axis data with statistics. Press T to show a table of the fitted trend data, the residuals and fit statistics (if a trend line is selected, see below).
- ▶ The Ins key permits you to insert text directly on the graph. While inserting text, press F1 for help on your text options.
- ▶ Press P to print a graph. A menu of printer choices will appear. You can then select a choice to begin printing.
- ▶ Press S to save a graph for later printing or viewing. The graph image will be saved in the common PCX bitmap format. You can use the PRINTPCX program (see page 15) to later view or print multiple images. PRINTPCX will also let you convert color PCX images into black and white images suitable for inclusion in a word-processing document.

**Figure 6.**  
Graph screen help

Variables	: ↑↓
Countries	: Page↑↓
New line	: + -
Axis data	: A
Trend data	: T
Insert text	: Ins
Print graph	: P
Save graph	: S
Exit graph	: Esc
Exit Help	: Any key

### Trend Line

- ▶ Fit a trend line to a data series simply by selecting the functional form from the Graph/ Trend Line menu (fig. 7).
- ▶ Refer to Help (F1) for further information or press T at the graph display for a table of results.

**Figure 7.**  
Trend line choices

Graph	
Display	
Trend Line	
Limi	
Styl	No Trend Line* Line Parabola Exponential Fit The Best
View	

### Limits

- ▶ The Limits choice allows you to change the span of the time series plotted, the span of the trend line fit, the display of projection results, or all of these. If a series or trend includes projected values, a vertical white line marks the last year of historical data. Figure 8 shows a two-series plot with trend lines and projection year limits.

### Style

- ▶ The Style choice permits you to choose line, bar, or scatter displays. Only bars will display if a profile is selected (see Viewpoint below).



## Viewpoint

- Choose Viewpoint if you want to change from a time series display to a profile display of either table or column names for a given year.
- The Viewpoint menu example (fig. 9) shows the selection of a European country profile from selected tables.
- After selecting Display from the Graph menu, the profile is drawn. See figure 10.
- For a Tables Profile (profile of data across tables), you can either choose the tables to be displayed or you can let TS select the top members and array them in order. A limit of 50 items can appear in a profile. The name of the Tables Profile and Columns Profile options will differ depending on the contents of the TS file loaded.
- The initial profile display is for the last year of historical data. Change the year by using the page keys (PageUp PageDown). Press F1 for help.
- By using the Top Members option you can quickly plot a sorted list of data items. Figure 11 shows an example.

Figure 8. Multi-line trend projections

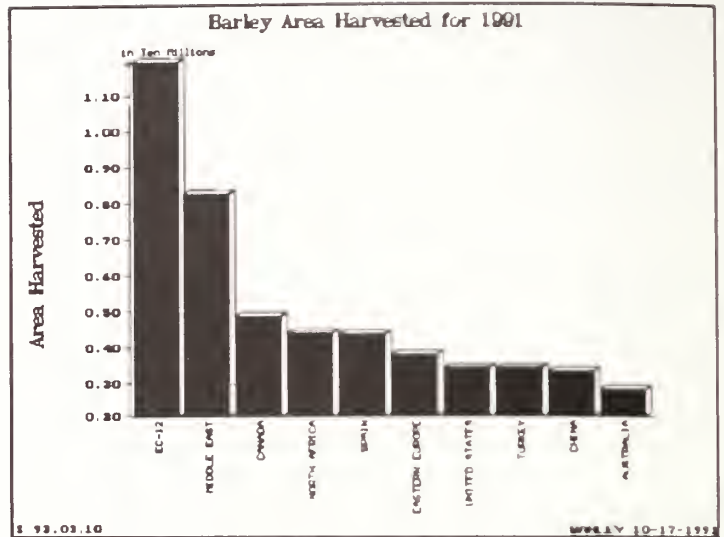


Figure 9. Viewpoint menu example

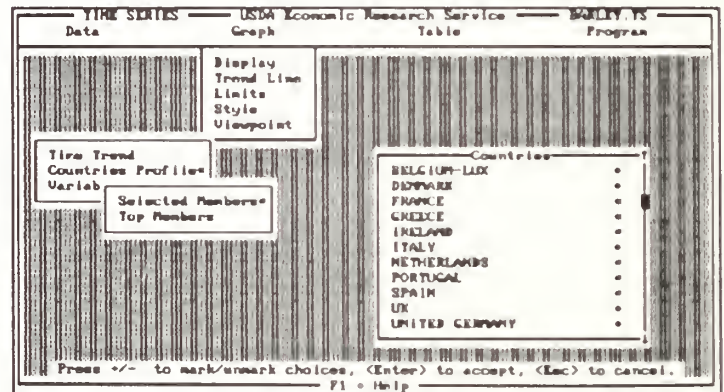
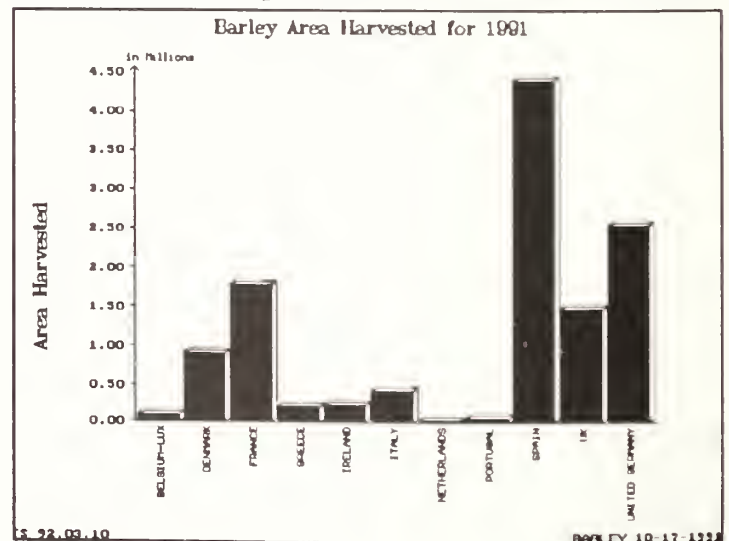


Figure 10. A plot of selected values



## The Table Menu

The Table menu (fig. 12) allows you to look at data in tabular format and to define subset tables that can be saved and imported into other software packages.

### Browse Data

- Choose this option to view individual data tables from the current file.
- When viewing tables, a help bar appears at the bottom of the screen. Use the page keys (PageUp PageDown) to change the table displayed or press Alt+T to pick from a list of tables. Use the arrow keys (↑↓←→) to scroll the columns and rows. You can jump directly from a table to a graph, or to axis and trend data. Press F1 for help on other choices.

### Create Tables

- When you choose Create Tables, you jump into another set of menus (fig. 13).
- Use the choices under Data to select the tables and columns you want to view or save. You must mark choices with the + key. Choose Reset Marks to quickly undo all of your selections.
- Use the Export options (fig. 14) to arrange the data, view it, save it, or print it.

**View** - displays a temporary text file of the data selected. It is a convenient way to view a subset of the tables and columns in a TS file. This also can be used to see the effects of Orientation or Layout selections before using the Save or Print option.

Figure 11. A plot of sorted values

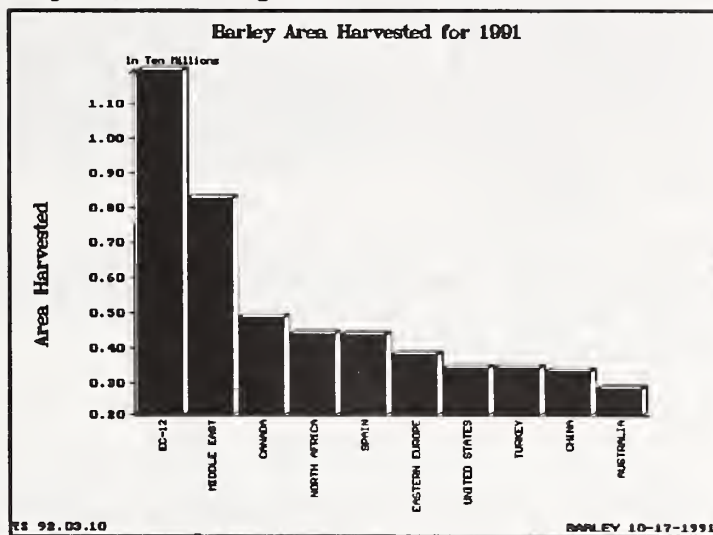


Figure 12. Table menu

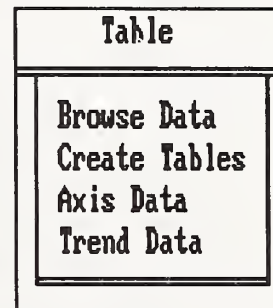
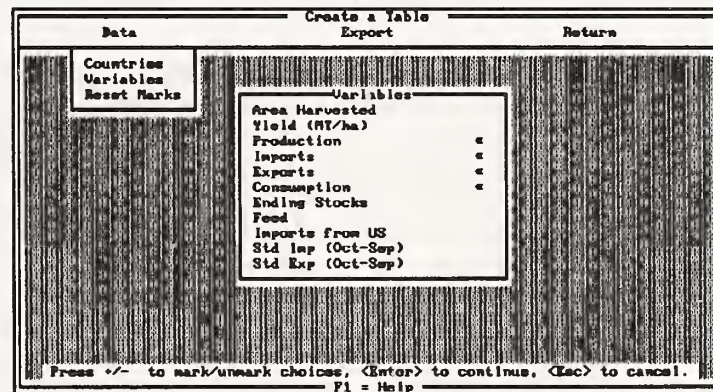


Figure 13. The Create Tables menus



**Save** - pops up a list of file formats to let you save your data choices to a file. You will be prompted for a file name. If you need to export TS data for use by other software, use this menu item. The WK1 and DBF file format selections are not affected by the Orientation or Layout options (see below).

**Print** - prints your current table and column selections. Many printers cannot print more than five columns of TS data. Use View to check the table width before printing.

**Orientation** - lets you array data tables side by side. The default is one above the other.

**Layout** - lets you array years across rows or down columns. The default is down columns.

- Go to the **Return** option to get back to the main TS menu or to clear your selections and create more tables.

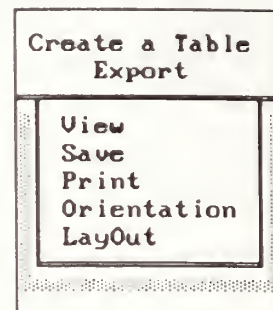
#### Axis Data

- This table option (fig. 15) at the main menu displays the latest data series selected, including summary statistics. This is the series used to plot a graph. To change the series, you must make a new choice from the Data menu.
- The Axis Data screen can also be displayed while at a graph by pressing the letter A. If more than one series has been plotted, only the last series is shown. The range of years used for the series and statistics can be adjusted through the Graph/Limits options.
- Table or column profile lists and statistics are shown if a Graph/Viewpoint profile is chosen. You can quickly see a list of the tables with the greatest values (for example, countries with the highest commodity consumption) by choosing a table profile from Graph/Viewpoint and selecting the Top Members option. Then select Table/Axis Data to view the list or Graph/Display to plot a chart.

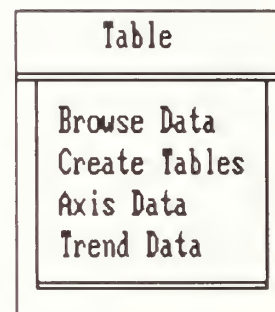
#### Trend Data

- If a Graph/Trend Line has been selected for a time trend, then the values composing the trend can be displayed with the Trend Data option (fig. 15). Summary statistics for the original series and for the trend are included, as well as residual values (trend minus original). The list scrolls with the arrow keys, and you can toggle between the axis and trend data with the A and T keys.

**Figure 14.**  
Export menu



**Figure 15.**  
Table menu





## The Program Menu

The Program menu (fig. 16) contains an assortment of functions. These provide help on the program or the data, load new files, change the units displayed, jump to DOS, or exit the program.

### Help

- The Help choice invokes the same Help screens as are available by pressing the F1 key at any of the menu screens.

### File

- File lets you select another data file from a menu. You can select files located in other directories or drives. Loading in a new file will return TS to its defaults (time trend, no trend line, no user-specified units or scalar). Only one file can be loaded at a time.

### Notes

- Choose Notes to read or edit text information on the current data file. You also can pull up the Notes box by pressing ALT+N at any of the menus.

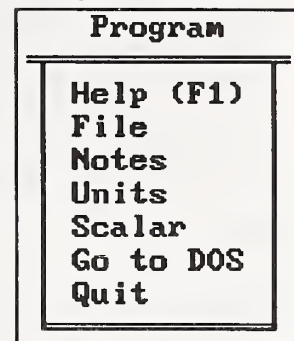
### Units

- The Units choice allows you to change the units displayed. Choices are the default magnitude, an index based on the value for a given year, and user magnitudes. If "WORLD" is the first table, then a share of the world's value choice is also available. This option affects both graphs and tables. The default magnitude for most TS data files is 1,000; that is, the value seen in a table is in thousands.

### Scalar

- Scalar lets you multiply all displayed values by a user-selected scalar. This function is useful for converting units of measure (for example, changing metric tons to bushels). Note that all series will be multiplied by the same conversion factor. This can lead to incorrect values for series with different units of measure (that is, the value used in converting metric tons to bushels will also be used on series that originally may not have been in metric tons).
- The scalar can range from 0 to 1,000; if it is any value besides 1, you will be prompted for the new unit label. Remember that the default is usually 1,000. Most series in the PS&D data files are in 1,000 metric tons.

**Figure 16.**  
Program menu



## DOS Shell

- The DOS Shell choice returns you to the DOS prompt temporarily, but keeps TS in memory. This is not the normal way to exit the program. It is useful if you need to execute a DOS command and would like to return to the same data file. The data file itself is dropped from memory and reloaded upon return, so default values will be in effect (see File above).

## Quit

- This exits the TS program. You also can exit the program from almost any screen by pressing ALT+X or ALT+Q.

## **The TIME SERIES Utilities**

There are currently over two dozen TIME SERIES utilities (see page 37). The TS utilities let you exchange data between TS files and other files, manipulate the data in a TS file, or create new TS files from data in one or more existing TS files.

The interactive programs - those that prompt the user for keyboard input and execute based on the user's response - are marked with an double-headed arrow (↔) in the tables. The unmarked programs are batch programs, that is, they execute based on instructions provided by the user at the time the program is started. For all the batch programs, you can type the name of the program to obtain instructions on how it works and what information it needs as input. The distinction between interactive and batch is important because it provides a rough delineation between one-time single-user manipulations, which are best done interactively, and repeated data maintenance and data file-building tasks, which are carried out more easily in batch mode.

The discussion of the TIME SERIES utilities is divided into four sections corresponding to four sets of applications. Each section contains a table listing relevant TS utilities, followed by descriptions of their purpose and use. The first section reviews the utilities used in general support of the TS program and the suite of utilities. The second section discusses file conversion utilities to move data into and out of TS data files. The third section discusses the utilities used to manipulate or change the data within a single existing TS data file. The last section covers the utilities used to create a new TS data file from two or more existing TS data files.

Sophisticated data manipulations or queries should be done in a database management or spreadsheet program. You can then convert the output values from these software packages to TS files for easy viewing.



There are three key features of the TIME SERIES program itself (TS.EXE) that are particularly relevant to the creation and manipulation of new TS data files: file notes, creating tables, and compressed files.

### **File Notes**

Within TIME SERIES, you can type ALT+N or select Notes from the Program menu to display text information pertinent to the current TS file. As long as the TS data files created are for the use of a limited number of people, most users will not bother to add this information. For more widely distributed TS files, adequate documentation is essential to prevent the misuse and misinterpretation of data. This documentation is easy to incorporate. Create an ASCII text file with the information you wish to provide and give the text file the same name as the TS data file, but with a DOC extension. For example, WHEAT.DOC would be the documentation file for a WHEAT.TS or WHEAT.TSC file and the information in it could be accessed on screen from the TIME SERIES program by pressing ALT+N when the WHEAT.TS file is loaded.

### **Create Table Function**

You can output a subset of the data already in a TS data file to a spreadsheet-readable file with the Create Table function in TIME SERIES and TSTABLES (see page 21). This can be a useful starting point for building a PRN file for use with the PRN2TS utility. For most purposes, however, other TS utilities will perform the desired manipulation(s) faster with less chance of user error. The TS utilities handle only common manipulations of data. When other manipulations of data are needed, the user must resort to a more fundamental method: the creation of a TS data file from an ASCII text file (from spreadsheet or database management program output) and a text file of instructions for the PRN2TS utility.

### **Compressed Data Files (TSC Files)**

TS data files with an extension of .TSC are compressed data files created with a file compression utility (two of the more popular such utilities are PKZIP and LHARC). This is done solely to conserve disk space. These files are self-extracting archives of the data. An archive file must be opened before it is used by the TS program (TS.EXE) or any of the TS utilities. This opening process is done automatically when you select a TSC file in the TS program, but you must do it manually if you want to use the TS utilities upon a TSC file. You also may prefer to keep uncompressed TS files to save time in loading data when running the TS program. This comes at the cost of disk space. See the Compressed Data Files section (page 34) for more information.

Table 1-- General support utilities

File name	Description of function
TSSHELL.EXE↔	A menu shell with descriptions and syntax instructions for all of the TS utilities. With TSSHELL, you can scroll through a list of the TS utilities and run the one you want. This is a good entry point into the suite of TS software.
READ.EXE↔	A utility for reading DOS text (ASCII) files. This is used by the TIME SERIES main program and the TSTABLES utility to view user-created tables.
PRINTPCX.EXE↔	A program to print graphs saved in PCX format by TIME SERIES.
TSHELP.EXE↔	A hyper-text guide to the TS utilities, useful for selecting the correct utility for the task you have in mind.
SPECS.EXE and MAP.EXE	Utilities to check computer hardware, settings, and memory use. These are useful for trouble-shooting.
DRIVES.EXE	Lists the disk drives present on the computer and the free space available on each. This is useful in selecting a drive for software and data installation.

## General Support Utilities

There are only a few programs you need to know about to start using the TS software. These are listed in table 1. The TSSHELL.EXE utility lets you browse through and run any of the TS software programs, including the core TS.EXE program described in the first part of this document. Most of the TS utilities run much faster if your PC has a math co-processor. You can run the SPECS utility (page 16) to check if one is present in your PC.

### TSSHELL.EXE

A menu-driven interactive utility that combines the features of all the TS utilities is a long-run objective of this development process. The TSSHELL utility is a first step in this direction. The version documented here is merely a menu shell with program descriptions and instructions for all the TS utilities.

To activate the menu shell, type *TSSHELL* from within the subdirectory which contains the TSSHELL.EXE program, the TSSHELL.CMD file and the TS utilities. Use the menu descriptions to decide which utility will perform the task you want and to execute that program.

## READ.EXE

The READ utility lets you scroll text or documentation files such as README.DOC. TS requires it to view a user-created table. Just type READ followed by the full name of the text file to view. If no file name is given and a README.DOC file is found, then README.DOC will be displayed. READ.EXE can handle very wide text files up to 5,000 lines long, depending upon available RAM.

## PRINTPCX.EXE

This program lets you print, display, and change the colors of graphs saved by the TS program. Saving graphs in TS for later printing by PRINTPCX is more convenient than waiting for TS to finish printing a graph before getting back to work. Change to the directory containing your saved PCX files (they will have a PCX file name extension), and type PRINTPCX.

To view or print a TS graph, use the arrow keys (↑↓) to highlight the file name. Press ENTER to view the graph, and ESC to quit viewing. PRINTPCX also allows you to view or print many graph images at a time. If you mark a set of graphs with the plus key (+) and press ENTER, PRINTPCX works like a slide show presenting each graph image on the screen for 5 seconds. Press PAUSE to keep an image on screen. Likewise, if several graphs are marked using the plus key they can all be printed by pressing F1. Use the F2 function key to toggle between printer choices. Only HP compatible laser printers and Epson compatible dot-matrix printers are supported.

The Drain Colors choice (F3) converts a PCX image saved on a color monitor to a black and white image that may be more appropriate for importing into a word processing document. Once colors are drained they cannot be replaced.

Figure 17. The PrintPCX utility menu

PRINT PCX 91.10.17 USDA ERS			
PCX Images			
ECBEEF	PCX	24k	7-24-1990
ECBFUL	PCX	47k	10-25-1991
TEST	PCX	23k	9-24-1990
USCG	PCX	34k	9-14-1990
WBFUL	PCX	24k	10-25-1991
Action Keys			
F1 = Print	F2 = Printer (HP LaserJet, Landscape)	F3 = Drain Colors	F10 = DeleteFile
F4 = Reverse Colors	F5 = Type Text	+/- = Mark/Unmark	
↑↓ = View	↑↓ = Scroll		



The Reverse Colors option (F4) is useful for changing a PCX image for use in a word processing document or desktop publishing file. This selection will turn the black background of a graph white. If you want to import an image into a word processor such as WordPerfect, you would use F3 followed by F4. Any Reverse Colors changes made can be reversed by pressing F4 again.

The Type Text option (F5) lets you annotate a graph with large or small text in either horizontal or vertical orientation. It works just as in TS, and help is available with F1 when you are in Type Text mode.

### TSHELP.EXE

The TSHelp utility provides a function-oriented guide to the selection of an appropriate TS utility for the task at hand. Just type *TSHELP* to start the program. Use the arrow or tab keys to move between the highlighted topics, and press *ENTER* to jump to a topic. To quit, press *ESC*.

### SPECS.EXE, MAP.EXE, DRIVES.EXE

These are simple utilities to check computer hardware and memory use. These are useful for trouble-shooting or displaying basic information about the status and setup of your PC. SPECS will give a summary of system components, memory configuration, and drive status; MAP will show a listing of programs loaded in conventional DOS memory; DRIVES will list the drives available on your PC, their size, and available space.

## **File Conversion Utilities**

Data in the TIME SERIES program are easy to view and analyze because they have been assembled in a well-structured format that allows the program to find and display the appropriate series based on menu choices. The USDA PS&D commodity data fit this criteria because each of the country tables in the PS&D commodity files has been set up with the same column and row headings. Many other data sets can be organized along the same lines for incorporation into the TS software. A few guidelines should be followed, however, to ensure that the organization of the data best meets the objectives of the user.

- ▶ TS is designed for viewing annual time series numeric data. If your database does not contain annual data or contains only a limited number of years of annual data (less than 10 years, for example), then the TS program will be of limited use.
- ▶ All or most of the data in a file should be in the same units (for example, thousand metric tons or millions of dollars) to facilitate graphical comparisons of data series. If a data set contains series in a number of different units, it might be better to build TS data files from subsets with similar units.

- An organized data set is just numbers organized in a multidimensional space. The PS&D data, for example, have a year, variable, country, and commodity dimension. TS imposes a hierarchy on these data set dimensions. The first and most important dimension is the annual time series because the default graphical display of the TS program is as a trend over time. The analyst must define the second and third most important dimensions based on which comparisons are most useful to the user(s) of the data. When you create a new TS data file using the procedures described below, make the second and third most important dimensions of the data set the column and table headings, respectively. For the PS&D TS files, the data are organized by commodity file to facilitate within-country and cross-country comparisons within a commodity market. Cross-commodity comparisons of data series are not possible with the single-commodity PS&D files because the TIME SERIES program cannot access information in separate files simultaneously. Multi-commodity files can be built from single-commodity files by using the TS utilities, however.
- If a data set already exists in a well-organized format but the hierarchy of the data dimensions is not appropriate for the intended use, it may be easier to first incorporate the data into TS and then use some of the TS utilities, discussed below, to reorganize it.

Several TS utilities help transfer data between TS files and other common file formats (table 2). If you locate data in TS files that you want to use in other applications, you can export the data easily with these utilities. Likewise, if you have data in a text, spreadsheet, or database file, you can create a TS data file from your data with these utilities.

Table 2-- File conversion utilities

File name	Description of function
PRN2TS.EXE *.PRN/*.MNU	Creates a TS binary file from data in an ASCII text (PRN) file. The utility uses a text configuration file with a MNU extension for instructions.
WKS2PRN.EXE	Dumps the labels and values from a spreadsheet file to a text file.
TS2MNU.EXE	Creates the MNU configuration file for an existing TS file.
TS2PRN.EXE	Generates a PRN file from a TS file.
TS2WK1.EXE	Creates a Lotus 1-2-3 v2 compatible spreadsheet file from a TS data file.
TS2DBASE.EXE	Generates a file in a format compatible with database management programs from a TS data file.
TS2DBF.EXE	Creates a dBASE III+ compatible database file from a TS data file.
TSTABLES.EXE+	A utility for viewing and creating tables and new TS files from existing TS files.



All of these conversion utilities, except TSTABLES.EXE, take in filenames as parameters and process all of the data in those files. That is, running TS2DBF upon a CORN.TS file will produce a DBF database file containing **all** of the data in the CORN.TS file and not a subset. If a subset is desired, you can use the Table/Create Tables choice in the main TS program (TS.EXE).

### PRN2TS.EXE

The utility for converting electronic data tables into TS data files is PRN2TS. It is a batch program and uses two files: an ASCII file that contains the data to be converted (.PRN extension by default), and an ASCII configuration file with a .MNU extension that contains instructions on the data organization and menu headings (fig. 18). Both files must have the same name as the TS file that is to be created. For example, to create a WHEAT.TS file, the PRN2TS program would need a WHEAT.PRN file and a WHEAT.MNU file.

The ASCII data file must be organized with years in the first column or first row of each table.<sup>2</sup> All data tables must be the same size with the same number of rows and columns, forming equal sized "blocks." Rows and columns must be in the same order within each of the blocks and all cells must contain a numeric value. If an entire series is zero or missing for one or a few of the blocks but present in other blocks, zeros or some number must be entered for the series.

Figure 18 shows how the information in the .PRN and .MNU files are linked for a simple data file with 6 data tables and 14 columns with the years down the first column. You can build much larger files. ERS uses TS data files with over 190 country tables, each containing 16 columns of variables and over 30 rows of annual data. The current PRN2TS program allows you to create a TS data file with up to 500 tables and 100 years and columns. Once you have a .PRN file and a .MNU file that correspond, you can create a TS data file by typing:

**PRN2TS FILENAME.PRN**

where FILENAME.PRN is the name of the ASCII data file.

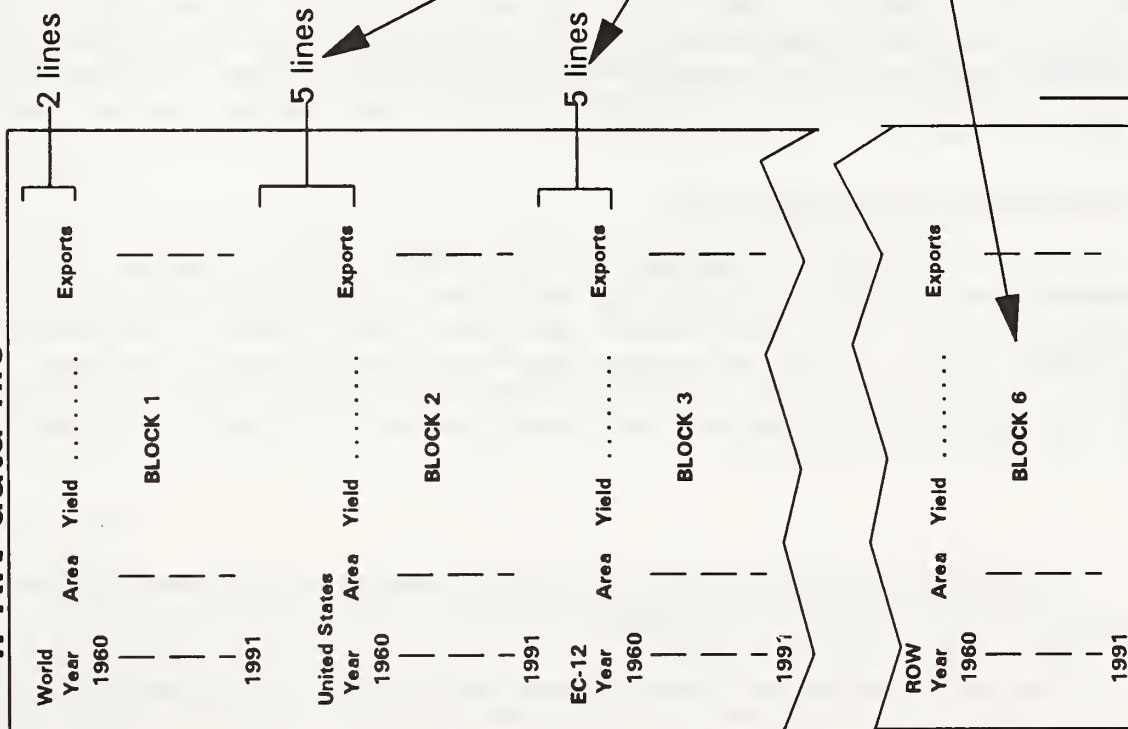
Remember, the name of the new TS data file will correspond with the name given the two source files (that is, a WHEAT.PRN data file and a WHEAT.MNU instruction file will create a WHEAT.TS file). If you have followed all the steps properly, the PRN2TS program soon will create a new TS file. If you have neglected an

---

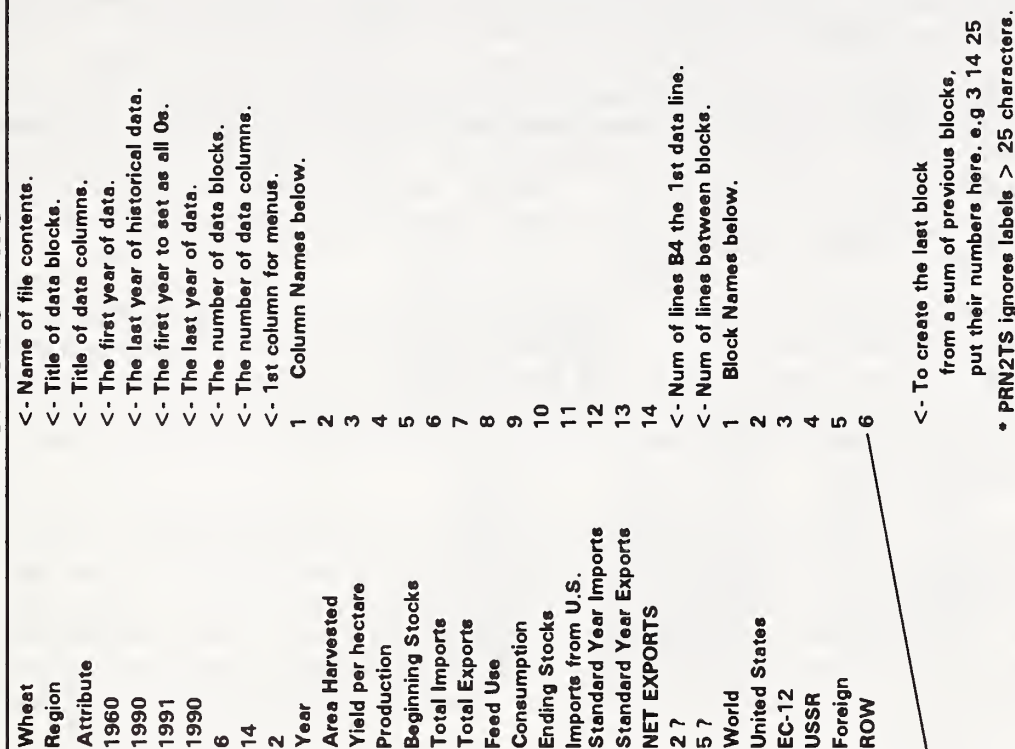
<sup>2</sup>Years may be arrayed across the top row, but if the time series is very long--say, 40 years of entries with 6 or more digits--the width of the .PRN file may exceed 240 characters. Although this presents no problems for the PRN2TS program, it is often a limitation for the spreadsheet or ASCII editor programs used to generate the .PRN file.

Figure 18. MNU file information must correspond with the PRN file

## .PRN data file



## .MNU file



PRN2TS.EXE → .TS data file

item or have failed to get the proper correspondence between the PRN data file and the MNU configuration file, one of two types of errors will occur. You may receive an error message and the TS file will not be created. This will happen if you have failed to specify the correct number of blocks or columns.

The second type of error occurs when the PRN2TS program creates a TS file but the table or menu headings are mislabeled. This can happen when the labels and parameters in the MNU file do not correspond with the PRN file. These errors are more difficult to catch. You should carefully check the data in the new TS file against the original source.

One of the easiest ways to create a PRN file is to first assemble and organize the data in a spreadsheet file with the regular block and column configuration explained above. Then export the data to a text or PRN file. If the PRN file requires further editing, use a DOS text editor such as PROGRAM EDITOR from WordPerfect Corp.<sup>3</sup>

The MNU file can be created by typing the instructions in a text file following the format in figure 18. The PRN2TS program reads only the first 25 characters in each line, so it is not necessary to type in the line prompts for the MNU file. The easiest way to create an MNU file is to edit an existing one. If one does not exist, you can create an MNU file called BASIC\_TS.MNU by typing *PRN2TS /SAMPLE*.

#### WKS2PRN.EXE

The WKS2PRN utility helps start the process of generating a TS data file from data kept in a spreadsheet WK1 or WKS file. By running *WKS2PRN FILENAME.WK1*, all of the values and labels in FILENAME.WK1 will be saved to FILENAME.PRN. You can then edit this file and a matching FILENAME.MNU file before using the PRN2TS utility.

#### TS2PRN.EXE and TS2MNU.EXE

TS2PRN and TS2MNU will generate the PRN and MNU text files, respectively, for an existing TS file. Both programs are very simple to run. For the TS2MNU program, for example, type *TS2MNU FILENAME.TS*. These programs can be useful if you have an existing TS file that conforms more closely to the format of the file you wish to create than does the generic BASIC\_TS.MNU output of the PRN2TS program.<sup>4</sup>

---

<sup>3</sup>If some or all of the data you wish to assemble are already in one or more existing TS data files, the task of creating a new TS file is easier. See the section, "Multiple-File Utilities."

<sup>4</sup>You can also use the Create Tables capability of the TSTABLES utility to write a new TS file and the associated MNU file for a subset of the data in an existing TS file.



## TSTABLES.EXE and READ.EXE

Two utility programs - TSTABLES and READ - will help you check a newly created TS file against the .PRN and .MNU files used in its creation. TSTABLES permits you to view and create tables of TS files. These are features of the TIME SERIES program itself, but tabular functions are easier to access through the TSTABLES program. Just type *TSTABLES* and you will see an opening menu like the one in figure 19.

Select "Load a TS File" to get a menu of the TS data files available and then select the TS data file you wish to view from a menu of files available. Once a TS data file is loaded, you can go to the Browse Tables menu choice to examine the data.

You can quickly check your .PRN and .MNU source files for the source of the problem with the READ.EXE program if you do find an error. Just type **READ FILENAME.TXT**.

READ.EXE does not allow you to edit files but you can scroll up and down and left and right to see if you can identify the source of the error before using a text editor to correct the error.

## TS2WK1.EXE

The TS2WK1 utility creates a Lotus 1-2-3 v2 spreadsheet-compatible WK1 data file from the entire data contents of a TS file. Type *TS2WK1* for information on its use. Caution: WK1 files are about four times the size of TS files, so you will need plenty of available disk space to create WK1 files from large TS data files. If you want to export a subset of a TS file to a WK1 file, use the Create Tables/Export/Save choice in the main TS program.

## TS2DBASE.EXE

The TS2DBASE utility uses a TS data file to generate a file format compatible with commercial database programs. It works like the TS2MNU and TS2PRN utilities. That is, you type *TS2DBASE FILENAME.TS* and the program will generate a database-compatible

**Figure 19.** TSTABLES opening menu with data file choices

TS Tables		E:\TS\UTIL\DATA\*.TS	
Load a TS File			
Browse Tables			
Create Tables			
Units			
(PARENT)	6/07/90	ec\$imprt.ts	2/24/89
187sugar.ts	6/05/90	ec\$prices.ts	1/23/90
argpse.ts	2/21/90	exintr.ts	1/18/90
barley1.ts	2/08/90	jpnmdat.ts	4/18/90
blprts.ts	11/03/89	prcproun.ts	2/23/90
canada.ts	2/01/90	prrice.ts	4/03/90
canpse.ts	2/21/90	rapeseed.ts	3/29/90
cgcom.ts	3/30/90	rice.ts	4/03/90
coarsegr.ts	2/22/90	scg3.ts	3/22/90
ec\$exprt.ts	2/24/89	scguh.ts	3/26/90
		srsseed.ts	3/29/90
		ssh3.ts	3/23/90
		ssbrssf.ts	3/29/90
		ssseed.ts	3/29/90
		sunseed.ts	3/29/90
		swb3.ts	3/22/90
		wldcguhsb.ts	4/30/90
		wheat.ts	1/19/90
		wheat8.ts	6/08/90

Choose a TIME SERIES file. Current file is : NONE

file of the same name with a CSV (comma separated value) extension. You may use DOS wildcards to generate a number of CSV files from TS files at one time. (Type *TS2DBASE \*.\**, for example, to generate CSV files for all the TS files in a subdirectory). Because many common data operations are easier in TS than in commercial database packages, you may wish to use the TS utilities to perform any desired reconfiguration of the data in TIME SERIES prior to converting a TS file to a database-compatible file.

### TS2DBF.EXE

The TS2DBF utility creates a dBASE III+ database-compatible DBF data file from the entire data contents of a TS file. Type *TS2DBF* for information on its use. If you want to export a subset of a TS file to a DBF file, use the Create Tables/Export/Save choice in the main TS program.

### **Single-File Utilities**

The major difference between TIME SERIES and its derivative program PS&D VIEW is that the former provides not only a means of quickly looking at and analyzing times series data, it also includes a set of utilities for carrying out standard manipulations of the data. PS&D VIEW is a look-but-don't-touch program. It is designed to allow users within and outside USDA to view tables, graphs, and time trends of official USDA supply-utilization data without allowing any changes to the historical numbers in the data files that the program displays. Users can export the data from PS&D VIEW for use in other programs using the Create Table option, but they cannot change the data the program displays.

The open framework of TIME SERIES allows users to tailor data files to fit their individual needs. The diversity of needs has led to demands for utility programs to facilitate the creation of new TS data files from existing TS data files. All the functions of these utilities could be performed by first doing the data manipulations in commercial database or spreadsheet programs, then creating new PRN and MNU files and using the PRN2TS.EXE program to build a new TS data file. In many cases, however, users merely want a modification of a file that already exists.

Modifications to an existing TS data file can be made using several different TS utilities (table 3). The menu shell program TSSHELL will facilitate the selection and use of these and other TS utilities. All are at different stages of development and all are likely to be revised based on feedback from users. The emphasis in building these utilities was to give users a program that would work and address an immediate need. Refinements will be developed with broader use.



Table 3-- Single-file utilities

File name	Description of function
TSBLOCK.EXE↔	Creates a new block of data from a combination of existing blocks in a file and appends it to the end of the file.
TSADD.EXE and TSSUB.EXE	Batch versions of the TSBLOCK utility for adding or subtracting data blocks.
TSCOLUMN.EXE↔	Computes a new column from two existing columns and appends it to the right of the last column in the TS file.
TSSUBSET.EXE *.BSS, *.CSS	Copies a subset of blocks (tables) or columns to a new file. For a block subset, use a configuration file with the BSS extension; for a column subset, use a configuration file with the CSS extension.
ADDYEARS.EXE	Adds year rows at the bottom of tables in a TS file so that projections can be saved to the file.
TSEDIT.EXE↔	A utility which allows the user to edit the data stored in a TS file.
TSUPDATE.EXE↔	Performs the same function as TSEdit except the data is presented by year to facilitate updating.
TSADJYR.EXE	Multiplies file values by a vector of annual values. Useful for exchange rate conversions and for deflating prices.
TSSCALAR.EXE	Multiplies one or more columns in a file by a scalar. It is useful for converting units (metric tons to bushels, for example).
TSTRIM.EXE	Removes from a TS file all tables, columns, and year rows which contain only zeros.

TSBLOCK.EXE

The TSBLOCK utility creates a new block (table) of data from a mathematical combination of the existing blocks and appends it to the end of the TS file. The utility allows you only to add, subtract, multiply, or divide one block by one or more other blocks. In mathematical terms,

[Block A] [Operator(+,-,\* or/)] [Block B] [Operator] [Block C]...

This utility is especially valuable for creating country aggregations for supply-utilization data. To use the program type *TSBLOCK*. The *TSBLOCK* opening menu will give you a list of files available in the current directory from which you can choose the file you need. Once you have loaded a TS data file into *TSBLOCK*, you will be presented with a pick list of the tables within the file (fig. 20).

If you want to create a Rest-of-World grouping, for example, you would choose the World table here. Next, you will be presented with a choice of operators. For the Rest-of-World example, you would choose "-" here. Again, you will be given a list of the tables in the TS file with the first table you selected marked with a "\*". Choose one or more of the unmarked tables using the "+" key. Press *ESC* when you have completed your choices. For the Rest-of-World example, you would choose those countries that you do not want to include in the new Rest-of-World table (i.e., tables that are to be subtracted from the World table). Finally, *TSBLOCK* will prompt you for the name of the new table. This name will appear on the TS menu listing of table names in the new data file. After the calculations are completed, you are asked for a name for the new TS file. If you choose the same name as an existing file, you are given the option to overwrite the existing file or to choose a new name.

Some thought should be given to what the *TSBLOCK* operation implies for all the columns within a table. An arithmetic operation may make sense for columns that are in one type of unit, but not for others that are in another type of unit. The *TSBLOCK* utility, however, carries out the operation that you specify on all the columns. *TSBLOCK* handles the USDA PS&D data as a special case, in that yields are recalculated for the new table.

**Figure 20.** *TSBLOCK* screen with a sample file

```

===== 92.12.17 TSBLOCK : Create New Blocks =====
Choose a source file: C:\TS\BARLEY.TS
Select the first table: WORLD
Choose an operation (+ - * / Esc): -
Mark the tables (+ -) to Include, then press <ENTER>:

```

Data Blocks	
* WORLD	
FOREIGN	
CENTRALLY PLANNED	
NEWLY INDUSTRIALIZING	
LESS DEVELOPED	
UNITED STATES	«
CANADA	«
MEXICO	
CARIBBEAN	
CUBA	
ARGENTINA	«
BRAZIL	
SOUTH AMERICA EX., BRAZ.	
BOLIVIA	
CHILE	
COLOMBIA	

## TSADD.EXE and TSSUB.EXE

The TSADD and TSSUB batch utilities perform the data addition and subtraction functions of TSBLOCK (see above). Their advantage is in routine data management in that a set of data blocks to be manipulated can be specified once and then used repeatedly. For example, if you would like to create a new regional aggregate using monthly updates of the PS&D data and the list of regions to include is large, then TSADD or TSSUB can help automate the process. Both utilities require a configuration file specifying the name of the new file to create and a list of the data tables to process. Type *TSADD /SAMPLE* or *TSSUB /SAMPLE* for a sample of the required configuration files.

## TSCOLUMN.EXE

The TSCOLUMN utility performs arithmetic operations on columns within tables. Just as the TSBLOCK utility performs the same operation on all columns of the designated tables, the TSCOLUMN utility performs the designated column operation on all tables. Unlike the TSBLOCK program, however, only arithmetic operations between two columns at a time are permitted. The math operation is:

[Column X] [Operation(+,-,\* or /)] [Column Y]

Suppose, for example, you had a file of supply-utilization data for wheat and you wished to compare the change in stocks for all countries in the file. You would type *TSCOLUMN* and respond to the prompts presented to you, selecting Beginning Stocks and Ending Stocks from a menu display of the column headings, and minus (-) as the operator. The last two prompts ask for the name of the new column you wish to create and the name of the new file. The new column is appended to the right of the existing columns.

Although TSCOLUMN computes operations only between two columns at a time, it is relatively easy to carry out a series of two-column procedures to generate a desired result. The computation of a stock-to-use ratio, for example, would first require the addition of feed use and human food consumption to obtain total use and then a second run of TSCOLUMN to calculate the ratio as a final step.

## TSSUBSET.EXE

The TSSUBSET program extracts or reorders either blocks (tables) or columns from a source TS data file to create a new file. It requires a configuration file with a .BSS extension for handling blocks (tables) or a .CSS extension for handling columns. An example will be the easiest way to show how the TSSUBSET program works.



Suppose you have a file named WHEAT.TS containing wheat supply-utilization data with 6 data blocks and 14 columns, such as shown in figure 18. You could use TSSUBSET to reorder the blocks and delete the Foreign block by creating a text file named WHEAT.BSS with the following information:

```
Wheat.ts
Wheat2.ts
1
6
2
3
4
```

The first line refers to the TS file to be read and the second line is the name to be given to the new file to be created. The listing of numbers tells the TSSUBSET program to move the last block, labeled ROW, up to the second position on the menu and omit the 5<sup>th</sup> block labeled Foreign.

To run the TSSUBSET program for this example, you would type:

```
TSSUBSET WHEAT.BSS
```

For this program, the file extension is critical because it tells the TSSUBSET program whether to run block or column operations. If, in this example, you were to use the .CSS extension on the WHEAT filename, the TSSUBSET program would reorder 5 of the 14 columns (fig. 16) and omit the other 9. An easy way to create a BSS or CSS file for TSSUBSET is to edit the output of TS2MNU, as TS2MNU lists both the table and column names and their order in the file.

#### ADDYEARS.EXE

ADDYEARS extends the time period covered in a data file and enters zeros for all the new values. By adding space for additional years, this utility makes it possible to use the two edit utilities, TSEDIT and TSUPDATE to insert new data at the end of the time series or to save projections to the file. Another use of ADDYEARS is to make files containing different annual time series compatible so they can be manipulated with utilities such as TSCOPY and TSJOIN described below.

To use ADDYEARS, type:

```
ADDYEARS FILENAME.TS YEARS
```

For example, *ADDYEARS WHEAT.TS 5* will add entries for 5 more years to each of the tables in the WHEAT data file. You may use DOS wildcards with the ADDYEARS utility. For example, you could type *ADDYEARS \*.\* 7* and space for 7 years of data will be added to all the TS data files in the directory.

## TSEDIT.EXE and TSUPDATE.EXE

You can edit individual data entries in a TS file with either TSEdit or TSUPDATE. The difference between the two is that TSEdit displays data for editing in a time series column on the screen while TSUPDATE displays rows of data for a given year on the screen. Type **TSEdit FILENAME.TS** to edit the data in **FILENAME**. CAUTION: Any edits you make to the data are saved immediately to the disk, so make a back-up copy of your TS file before starting.

## TSADJYR.EXE

TSADJYR (TS Adjust Year) multiplies or divides all the columns in a TS data file by a time series vector of constants, as illustrated in figure 21. Its most common use is to convert data from nominal to constant values using an index of annual price changes, such as the GNP deflator. Another obvious application would be to convert data from one currency to another. The source file name, the new file name, the mathematical operation (/ or \*), and the vector of constants must be specified in a configuration text file constructed by the user. The configuration file can have any name and extension specified by the user, because TSADJYR reads the configuration file to pick up the names of the TS files to read and create. The syntax for implementing the utility is:

**TSADJYR FILENAME.TXT**

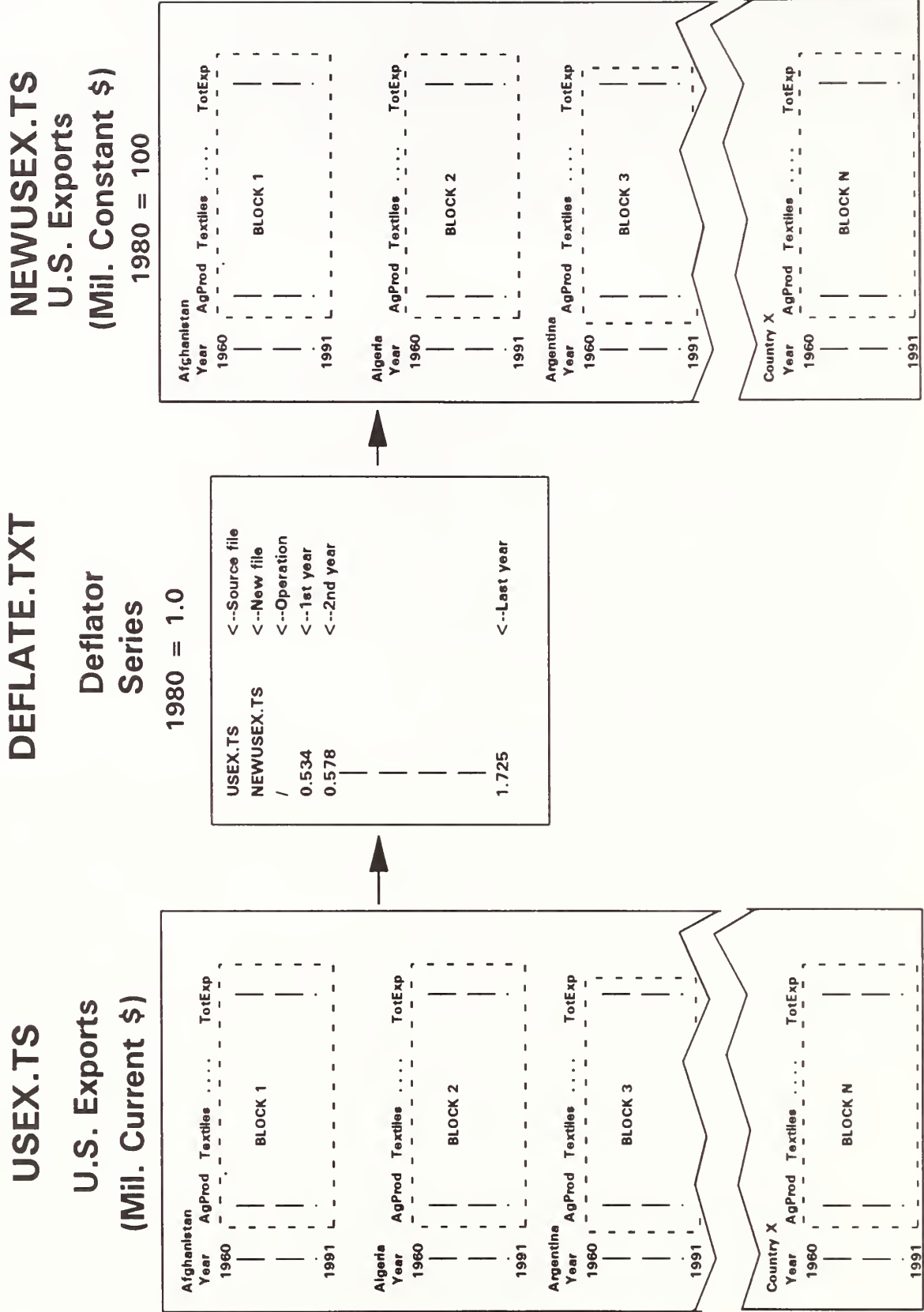
To obtain a sample configuration file that can then be edited, type **TSADJYR /SAMPLE**.

## TSSCALAR.EXE

The TSSCALAR utility multiplies an entire column by a single number or scalar. You can use it for converting from one set of units to another, such as from bushels to metric tons. TSSCALAR functions are similar to the Program/Scalar choice in the TS program menu except for two important differences. First, the TSSCALAR utility allows you to specify which columns are to be multiplied by the user-specified scalar. In the TS program, the Scalar option changes all the values displayed from the file. Second, the TSSCALAR utility writes the new values to the file you specify. In the TS program, only the display values are changed, not the original data.

The syntax for TSSCALAR is the same as for TSADJYR. The user must specify the source file, the new file name, and list the scalars which are to be multiplied by each column in a configuration file. The configuration file can have any name you choose. The list of scalars included in the configuration file, however, must match the order of the columns in the source file.

Figure 21. TSADJYR can be used to deflate data series





The first column - that is, the column with the year identifier in it - is multiplied by 1. Any column which is not being changed must also be multiplied by 1. As with the TSDAJYR utility, you can obtain a sample configuration file (which you can then edit) by typing *TSSCALAR /SAMPLE*.

### TSTRIM.EXE

TSTRIM was designed to reduce the size of TS data files that are used frequently, particularly the supply-utilization files. It removes any tables, columns, or years in a TS data file that are all zeros. The syntax for the TSTRIM utility is:

#### ***TSTRIM basefile outputfile***

or, for example, *TSTRIM rice.ts newrice.ts*.

Although TSTRIM is a great disk space saver, it may change the structure of a file so as to make it incompatible with other files. For example, TSTRIM would remove the Brazil block in a RAPESEED.TS file because Brazil does not produce or trade rapeseed. This is not a problem if you want to examine only the world rapeseed market. If, however, you want to focus on the world oilseed market, you could not use the TSFILE utility to aggregate the "trimmed" rapeseed.ts file and a soybeans.ts file because the table structure of the two files would not be the same (that is, country lists would differ).

The compromise of building a database with a consistent structure that is amenable to manipulation is that zeros must be maintained in places where data are not relevant. The result is that the size of a file needs to be greater than its information content would warrant in order to build software applications that make data manipulations easy and flexible. The TSTRIM utility makes the size of a TS data file more consistent with its information content but may sacrifice its compatibility with other files in the database.

### **Multiple-File Utilities**

It is often useful to merge the data kept in two or more TS files into a single TS file for viewing and use. Table 4 lists a developing group of utilities available to perform the more common of these tasks.

### TSCOPY.EXE

The TSCOPY program allows you to create a new file by copying the same table out of a series of existing TS data files. Thus, the TSCOPY program can be used to convert commodity TS files with country tables into country TS files with commodity tables. For example, the United States table could be copied from each of several commodity files to create a United States data file for

Table 4-- Multiple-file utilities

File name	Description of function
TSCOPY.EXE *.CPY	Creates a new TS file by copying the same table number from a series of existing TS files. The utility uses a configuration file with the .CPY extension.
TSCOPYNM.EXE *.CPY	Creates a new TS file by copying the same table (based on name) from a series of TS files. The resulting file has column names and year coverage encompassing the ranges of the TS files.
TSCOPYC.EXE *.CPY	Creates a new TS file by copying the same column of data from several TS files.
TSJOIN.EXE	Creates a new TS file by copying a user-specified column of data from a source TS file and joining it to a host TS file.
TSFILE.EXE	Aggregates two files with the same column and block structure.

cross-commodity comparisons. In its present form, the program is restricted to use with a large well-organized uniform set of TS data files. All the source TS files must have the same table sequence and structure. You must designate the location of the table to be copied and the TS files to use in a configuration file with a .CPY extension. Figure 22 shows graphically how TSCOPY works and shows how the .CPY configuration file information is used to generate the result.

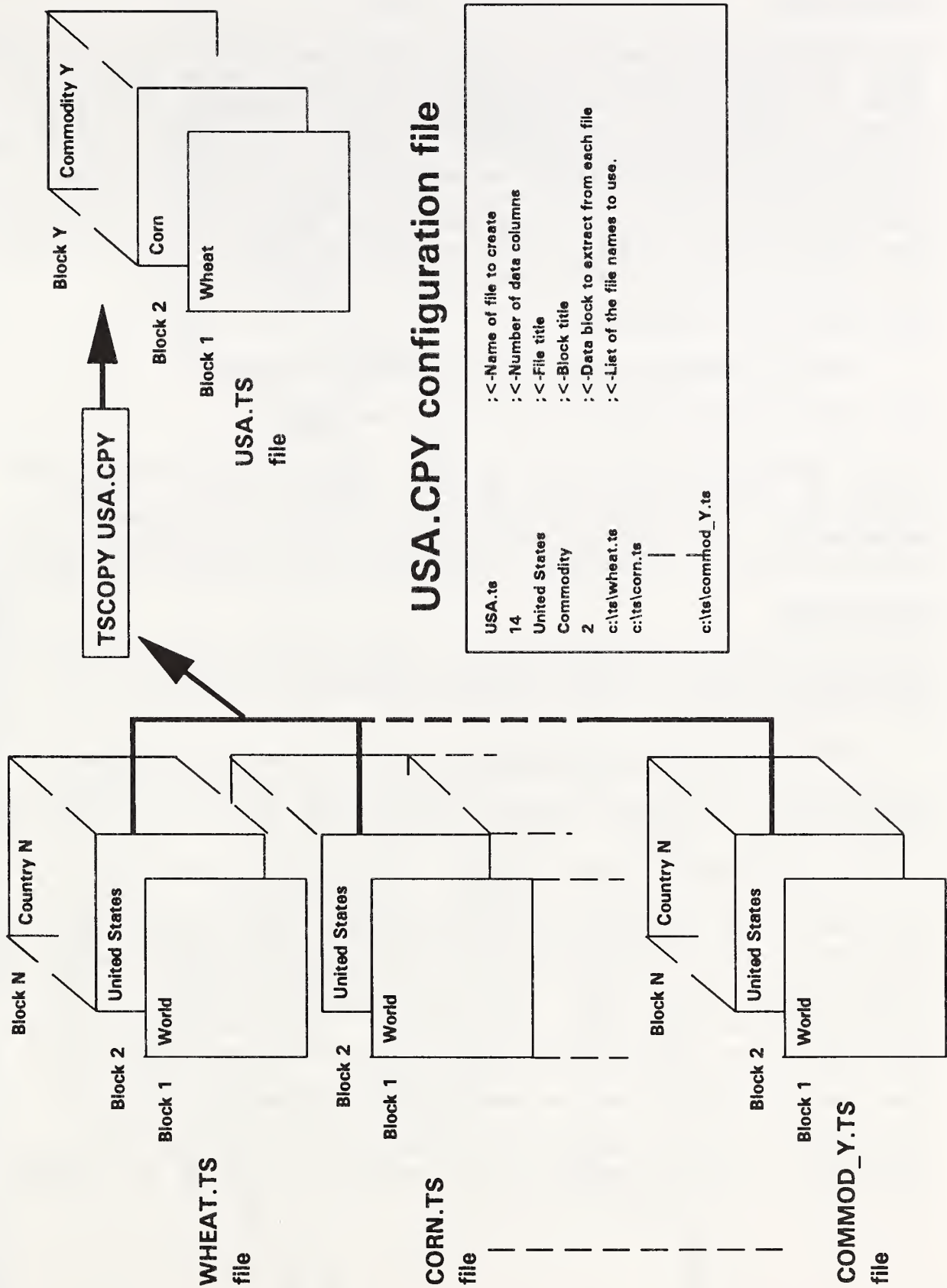
#### TSCOPYNM.EXE

TSCOPYNM is a variation of TSCOPY. It also copies the same table out of a series of TS files, but TSCOPYNM locates the tables based upon name - not table number. It is also more flexible in handling files with different year coverage and different column names. Use TSCOPYNM in place of TSCOPY, unless you must fix the number and names of columns to those of the first TS file listed in the CPY file. Type *TSCOPYNM /SAMPLE* for a sample CPY file. TSCOPYNM is the easiest way to create a country file from a mix of supply-use commodity files.

#### TSCOPYC.EXE

TSCOPYC works like TSCOPY except that it extracts data by column (instead of by table) from several TS files for placement in a new TS file. You could extract the Exports column, if present, from a series of commodity TS files. The result would be an EXPORTS.TS data file in which the exports for a number of commodities would be found in each of the country tables. The configuration file for TSCOPYC has the same extension, .CPY, and is virtually the same as the configuration file for TSCOPY.

Figure 22. TSCOPY extracts blocks from many files to create a new file





## TSJOIN.EXE

The TSJOIN utility merges a column from one TS data file with the data in another file. For example, you could merge population data in one TS file with supply-use data in another TS file, as shown in figure 23. The TSCOLUMN utility could then be used to compute a per capita utilization series. The TSJOIN utility does not require that the tables in both files to be in the same order. A table for China, for example, could be the 15<sup>th</sup> table in the population file and table 100 in the supply-utilization file. The table names, however, must be spelled identically or TSJOIN will not be able to match the tables in the two files.

The syntax for TSJOIN is:

***TSJOIN basefile sourcefile outputfile column#***

or, for example, *TSJOIN rice census newrice 2*

If no match occurs for a particular table in the basefile, the table is skipped and 0s are entered for the series. TSJOIN reports the unsuccessful matches in an output file named MISSING.TXT. You may use the READ utility, or any other ASCII text utility, to examine the contents of the MISSING.TXT file.

## TSFILE.EXE

TSFILE creates an aggregate or disaggregate TS file from two existing TS files of the same dimensions and structure.

The syntax is:

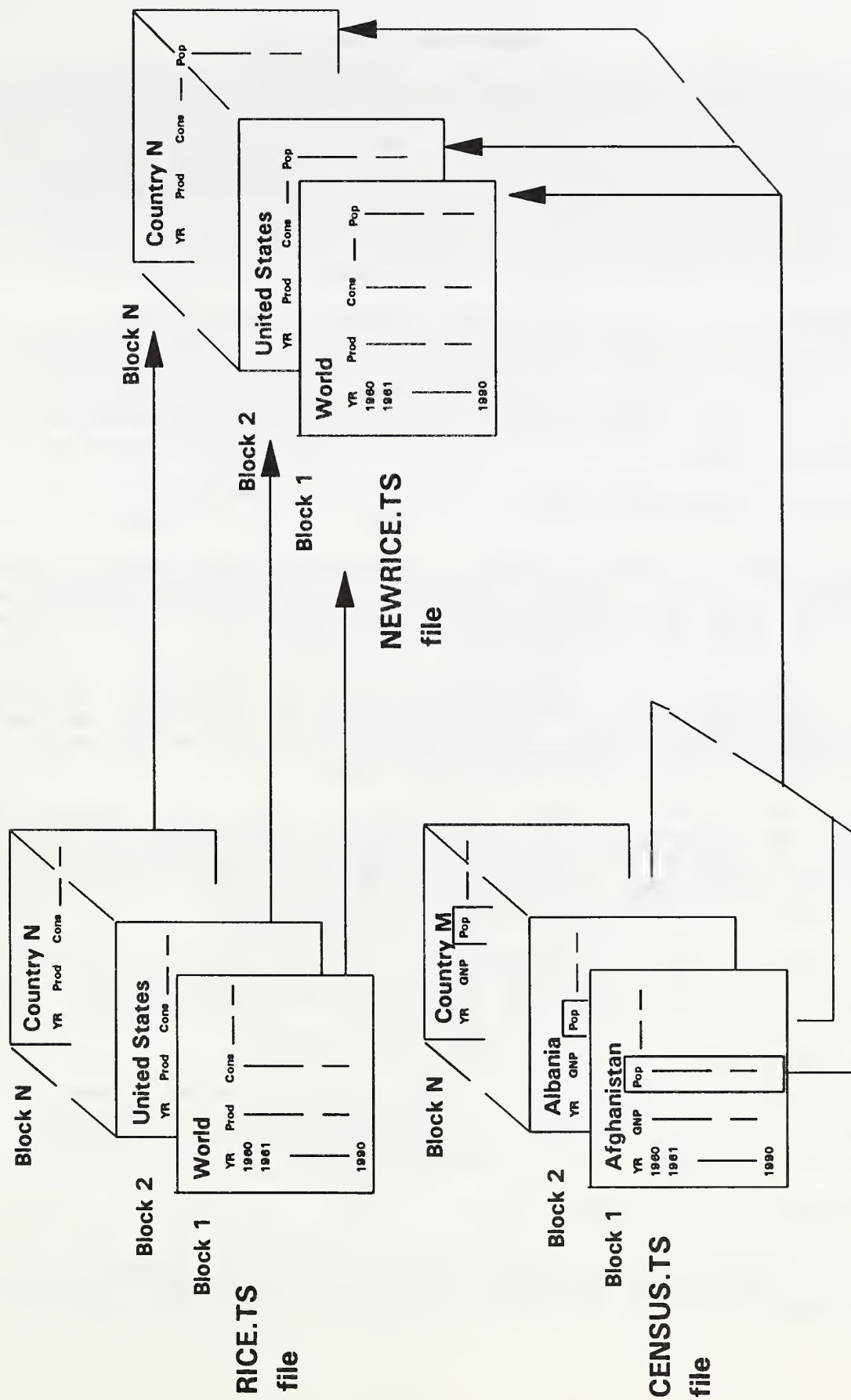
***TSFILE File1 [+\*/] File2 = Newfile / New File Title***

For example, you could create a food grains file from a rice and wheat file by typing:

*TSFILE WHEAT + RICE = FOODGR / Food Grains*

You could also use this utility to create a net exports file from an exports and an imports file. Particular care must be taken to ensure that there is a consistent table and column structure for both of the source files. An easy test of consistency is to check the size of the two source files. Both have to be exactly the same since space allocated for the data in each file will have to require the same number of bytes. (It is possible for two source files to be the same size and have different structures, but it is very unlikely.) If you need further verification of compatibility or need to find how two files are different, compare the MNU files generated by using the TS2MNU utility on the two source files.

Figure 23. TSJOIN appends columns of data



## Compressed Data Files

TS data files with an extension of .TSC are compressed data files created by a file compression utility such as LHARC or PKZIP. This compression is done solely to conserve disk space. When you select a TSC file from the TS file menu, the software opens the file for you and creates a temporary uncompressed TS file for use. On faster modern PC's, this takes only a few seconds and the wait is well worth the savings in disk space. However, there are limits to the use of the TSC data files.

Compressed TSC data files cannot be used directly by any of the TS utilities. TSC data files must first be uncompressed or "opened" if you want to use any of the TS utilities with them. To save disk space, you can compress TS data files which you create. Some data files will compress greatly, others will not. Batch files to open TSC files or to create TSC files are described here.

### OPEN.BAT and OPENALL.BAT

These batch files will use TSC compressed data files to create extracted TS data files. OPEN.BAT works on single files, one at a time. OPENALL.BAT will run OPEN.BAT for you on all of the compressed files in the current directory.

Use these utilities if you want to run any of the TS utilities on data in a TSC file. Also, if opening the .TSC files in the TS program takes too long, then you may want to create faster-loading .TS files with these utilities.

Type *OPEN* to see a summary of its use. Type *OPEN FILENAME.TSC* to create an extracted file. For example, *OPEN WHEAT.TSC* will create the WHEAT.TS data file. Both the OPEN.BAT file and the WHEAT.TSC file must be in the current directory, and the WHEAT.TS file will be created in the current directory.

The OPEN.BAT file is a text file, so you can read it using the READ.EXE utility if you are curious about how it works. Essentially, it renames the TSC file to a DOS executable name and then runs it. The OPENALL.BAT file is useful if you decide to use the larger but faster-loading TS files. Just type OPENALL to create TS files for each TSC file. You do not need both TS and TSC files of the same data. Delete those you do not need. Remember to keep backups of files you edit or manipulate to prevent unwanted loss or file overwrites.

### COMPRESS.BAT and COMPALL.BAT

These batch files do the opposite of OPEN.BAT and OPENALL.BAT. After using the TS utilities, you can use COMPRESS to create a compressed TSC data file if you wish to save disk space.



COMPRESS.BAT works on single files, one at a time. COMPALL.BAT will run COMPRESS on all TS files in the directory.

Type *COMPRESS* to see a summary of its use. Follow the word COMPRESS with the name of the TS file to compress to start the compression process. COMPRESS.BAT will use the LHARC utility to create a .TSC file for you. For example, *COMPRESS WHEAT.TS* will create WHEAT.TSC. If you have many TS files to compress, type COMPALL to compress all of them.

There are a couple of considerations to keep in mind when using compressed data files in the main TS program. TS will open the TSC file and create a temporary TS file. This TS file is created in the same directory where you start the TS program, so some disk space is needed there for use. The TS program checks for this space when the TSC file is selected. When you are finished viewing data from a TSC file and either exit the TS program or select another file from the Program/File menu, the temporary TS data file is deleted and the space it occupied is freed.

Another consideration is the possible loss of edits you make to a TS file by opening a TSC file. Suppose you use the TS utilities to manipulate data in a WHEAT.TS file. You may also have a WHEAT.TSC file that contains a compressed version of WHEAT.TS. If you select WHEAT.TSC from the TS file menu, you will be notified that the existing WHEAT.TS data will be overwritten if you continue. You will be given a chance to stop and select another data file. To avoid the loss of important data, store different versions of data files in separate directories and keep backups.

If you are using a Local Area Network (LAN) to house the TS software and data, you can keep uncompressed (.TS) data files on the file server so the workstations will not require temporary disk space for opened TSC files. (Note: TS was not written as a LAN-aware application. Its use on a LAN depends upon configurations provided by your LAN administrator and functions available in your LAN operating system and environment.)

### **Future Developments**

The analytical and manipulative power of TIME SERIES is dependent first and foremost on the organization of the data. This organization makes it possible to build software to operate on structured database files. We cannot emphasize enough the importance of developing a coherent data structure which is well-suited to its intended application. Once you have developed this structure, the marginal cost of converting the data to TS files is relatively small, particularly when compared with the analytical and manipulative benefits of the TS program and its utilities.

The TIME SERIES program and utilities are only a small, though exciting, part of the work we do. To the extent possible, we will try to respond to suggestions for further developments or for enhancements in the existing programs. If you have success with the TS utilities in developing your own TS databases, please send us a copy of your TS data file(s). We maintain a user list and will inform you of new software developments.

The long-term development objectives of the TIME SERIES program are to reduce the costs of converting data to TS files and to raise the benefits associated with using data within the system. This will entail a number of changes in the software over the next few years. As in the past, these changes will be driven in large measure by user demands. But each new development or modification contributes a little more toward the development of a comprehensive vision of what a "finished" product should do and how it should work. Below are some of the changes being contemplated. User demands and the difficulty of implementing them will determine if they are pursued further.

- Combine all or most of the key utilities into an interactive program with menus and user prompts. The TSSHELL program is a beginning in this attempt.
- Develop a TIME SERIES program that allows users to compare data series across more than just the three dimensions currently available (table, column, year). This might be done by developing a program that can load more than one file at a time or it might entail a fundamental change in the file format.
- Develop a more flexible file format to allow files to contain tables of differing sizes, each with unique columns.
- Develop a means of attaching a text note to each data series, with the user able to reference it with the touch of a key. As we move into more complex databases with multiple sources and no single hardcopy reference, this feature will be extremely important.
- For the file manipulation utilities such as TSCOPYC, and TSFILE, build in the ability to reference tables by name rather than by the position of the table in the file. This capability already exists in the TSCOPYNM and TSJOIN utilities.
- Add versatility to the TSCOLUMN and TSBLOCK utilities to allow the use of formulas instead of only single-function operations.
- Modify the TIME SERIES programs and files to allow viewing and manipulation of date-based observations (daily, weekly, monthly, and quarterly data).

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READ.EXE	A utility for reading DOS text (ASCII) files. This is used by the TIME SERIES main program and the TSTABLES utility to view user-created tables.	15
PRINTPCX.EXE	A program to print graphs saved in PCX format by TIME SERIES.	15
TSHELP.EXE	A hyper-text guide to the TS utilities, useful for selecting the correct utility for the task you have in mind.	16
SPECS.EXE and MAP.EXE	Utilities to check computer hardware, settings, and memory use. These are useful for trouble-shooting.	16
DRIVES.EXE	Lists the disk drives present on the computer and the free space available on each. This is useful in selecting a drive for software and data installation.	16

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TS2WK1.EXE	Creates a Lotus 1-2-3 v2 compatible spreadsheet file from a TS data file.	21
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TSADD.EXE and TSSUB.EXE	Batch versions of the TSBLOCK utility for adding or subtracting data blocks.	25
TSCOLUMN.EXE	Computes a new column from two existing columns and appends it to the right of the last column in the TS file.	25
TSSUBSET.EXE *.BSS, *.CSS	Copies a subset of blocks (tables) or columns. For a block subset, use a configuration file with the BSS extension; for a column subset, use a configuration file with the CSS extension.	25
ADDYEARS.EXE	Adds year rows at the bottom of tables in a TS file so that projections can be saved to the file.	26
TSEDIT.EXE	A utility which allows the user to edit the data stored in a TS file.	27

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TSADJYR.EXE	Multiplies file values by a vector of annual values. Useful for exchange rate conversions and for deflating prices.	27
TSSCALAR.EXE	Multiplies one or more columns in a file by a scalar. It is useful for converting units (metric tons to bushels, for example).	27
TSTRIM.EXE	Removes from a TS file all tables, columns, and year rows which contain only zeros.	29

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File name	Description of function	Page
TSCOPY.EXE *.CPY	Creates a new TS file by copying the same table number from a series of existing TS files. The utility uses a configuration file with the .CPY extension.	29
TSCOPYNM.EXE *.CPY	Creates a new TS file by copying the same table (based on name) from a series of TS files. The resulting file has column names and year coverage encompassing the ranges of the TS files.	30
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